

## Chapter Three

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# The World's Most Catastrophic Dam Failures

## *The August 1975 Collapse of the Banqiao and Shimantan Dams*

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In August 1975, a typhoon struck Zhumadian Prefecture of Henan Province in central China, causing reservoirs to swell with rainwater behind dozens of dams.\* When the torrential rains subsided, the massive Banqiao and Shimantan dams had collapsed, as had dozens of smaller dams. The destruction downstream was unprecedented: Eighty-five thousand people were dead, and millions more lost their homes and livelihoods.

The storm began on August 4, when the typhoon skirted by Taiwan and hit the Chinese mainland at the Jin River in Fujian Province. Because of a meeting of unusual weather patterns—one originating in the southern hemisphere near Australia and the other from the Western Pacific—the typhoon did not expend itself quickly when it reached Fujian, as is usually the case with storms coming in from the South China Sea. Instead, it gathered force as it moved through the southern provinces of Jiangxi and Hunan, and then took a sharp northerly turn straight toward the Yangtze River and the central plains.

On August 5, the typhoon suddenly dropped off the radar screen at the

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\*Excerpts from this report appear in Human Rights Watch/Asia, "The Banqiao and Shimantan Disasters." The typhoon's official designation was "Number 7503," and the events it helped precipitate, were called the "August 1975 Disaster."

Central Meteorological Observatory in Beijing. It had shifted direction again and was moving east, where it crossed over Henan Province heading toward the Banqiao and Shimantan dams.

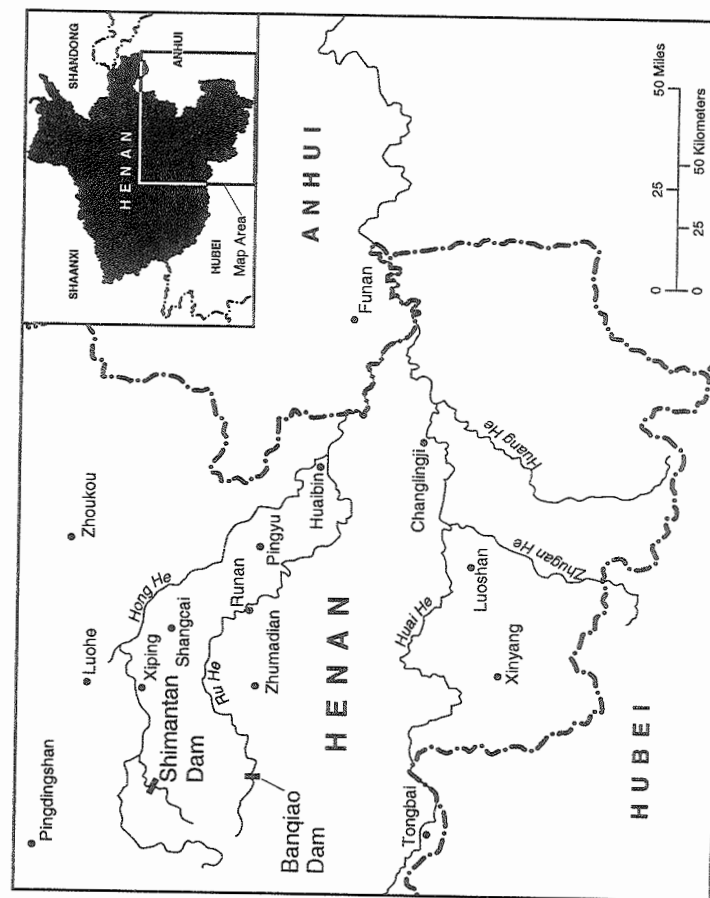
The storm hit hardest in the valleys between the Funiu and Tongbai mountains, where eyewitnesses described rainfall that had the force of a fireman's hose, and where, after the rain had subsided, dead birds were found strewn everywhere, the hapless victims of raindrops falling with the force of arrows. With some irony, the valleys, because they were prone to heavy rainfall, had always been considered an ideal place to build reservoirs. By 1975, when the typhoon hit, there were more than 100 of them in the area. But the dams could not withstand a storm this severe—one which dumped 1,000 millimeters of rain in just three days and which was well beyond the worst-case scenarios imagined by the designing engineers.

On August 8, the Banqiao reservoir at the Ru River was at maximum capacity; the water had reached the crest of the 118-meter dam and was still rising. The dam could not release water as fast as its reservoir was filling. When, shortly after 1:00 A.M., the flood waters rose 30 centimeters above the crest, the main part of the dam gave way and 600 million cubic meters of water surged forth. A wall of water six meters high and 12 kilometers wide rushed into the river channel and surrounding valleys and plains and destroyed virtually everything in its path.

The smaller of the two reservoirs, the Shimantan, reached its maximum capacity a half hour before the Banqiao, at 12:30 A.M. When the water rose 40 centimeters above its crest, the Shimantan dam also collapsed. One hundred and twenty million cubic meters of water burst forth from the dam at a rate of 25,300 cubic meters per second. Within five hours the entire reservoir was virtually empty.

The Nihewa and Laowangpo flood diversion areas downstream of the dams could not handle the 720 million cubic meters of water rushing out of the reservoirs; their capacity was only 426 million cubic meters. In Zhumadian Prefecture, many of the dikes collapsed, creating a 300- by 150-kilometer lake. When the Nihewa and Laowangpo catchment areas gave way on August 8, 100 million cubic meters of water poured into the Fenquan River. Later, on the evening of August 9, the floods reached the Fuyang area in Anhui Province. The Quan River dikes collapsed and the entire Linquan county seat was submerged.

According to the former minister of water resources and electric power, Madame Qian Zhengying, the disaster flooded 29 counties and



The Banqiao and Shimantan dams in Zhumadian Prefecture, Henan Province.

municipalities, 17 million mu\* of arable land (of which 11 million was severely damaged), affected 11 million people and killed 85,600.\*\* It also destroyed 102 kilometers of the Beijing-Guangzhou railroad, blocked all passage on the rail line for 18 days and halted cargo shipments for 48 days causing upward of one billion yuan in economic losses.

### The Quest to "Harness the Huai River"

Because of its location in the climatic zone that separates south and north China, the Huai River is subject to severe changes in weather. Until the twelfth century A.D., the Huai flowed unimpeded into the sea. But slowly, the Yellow River changed course, eventually blocking the Huai's entrance into the sea. This caused the slope of the riverbed in the lower and middle reaches to become gradual, so that both the mainstream and tributaries became less effective for draining flood waters.

In summer 1950, the Huai flooded, causing a great deal of destruction. In response, the State Council announced its campaign to "Harness the Huai River." The campaign would dam the upper reaches of the river in order to develop hydro power and control floods by both storing flood water in upstream reservoirs and in low-lying flood diversion areas and by dredging the Hong and Ru rivers, the chief local tributaries on the upper reaches of the Huai.†

\*One mu is the equivalent of 0.067 hectares. Conversely, one hectare is comprised of 15 mu.

\*\*This figure was eventually withdrawn and replaced with an official figure of 26,000 dead; however, the revised figure measured only those who drowned in the immediate aftermath of the dam collapses. Eight key dam critics and members of the Chinese People's Political Consultative Conference estimated that the true death toll was 230,000 (including those who died of consequent health epidemics and famine). See, Human Rights Watch/Asia, "The Banqiao and Shimantan Dam Disasters," p. 40. See also preface to *Zhongguo lishi dahongshui, shangce* (Major Floods in Chinese History, Vol. 1) (Beijing: Zhongguo shudian chubanshe, 1992). Also see the three books by the economists Tian Fang and Lin Fatang: *Lun sanxia gongcheng de hongguan juece* (On a Long-Range Strategy for the Three Gorges Project) (Hunan: People's Publishing House of Hunan, 1987); *Zailun sanxia gongcheng de hongguan juece* (A Second Look at a Long-Range Strategy for the Three Gorges Project) (Hunan: People's Publishing House of Hunan, 1989); and, *Sanlun sanxia gongcheng de hongguan juece* (A Third Look at a Long-Range Strategy for the Three Gorges Project) (Hunan: People's Publishing House of Hunan, 1992).

†The Huai River Development Plan was formally announced in April 1957 and was followed in September 1957 by a central directive launching the massive program of dam and reservoir construction.

The quest to harness rivers is not a recent one in China. During the Former and Later Han dynasties (202 B.C.–A.D. 8 and A.D. 25–220, respectively) irrigation projects proliferated. The Qingpo and Gepo projects in Xincui County, the Hongxibo and Shitangpo projects in Runan County, and the Ju Marenpo project in Biyang County are famous irrigation projects from this period. Numerous dams were also built from the Three Kingdoms (A.D. 220–280) to the Sui (A.D. 581–618) and Tang (A.D. 618–906) dynasties. These included the Ershisi in Xiping, the Zhangze in Suiping, the Shen in Zhengyang, and the Huangling in Shangcai. In the thousand years or so since the Song dynasty (A.D. 960–1279), however, most of these water control projects fell into disrepair and deteriorated badly, often contributing to floods rather than controlling them.

During the thirty-year campaign to "Harness the Huai River," the Shimantan dam was built in the upper reaches of the Hong River, and the Banqiao dam was built in the upper reaches of the Ru River. At that time, very little was known about the local hydrology and, as a result, there were serious problems with the original design and construction of the dams. During the second stage of construction of the Banqiao, cracks were discovered in the sluice gates and in the dam structure itself. As a result, in 1955–56, the two dams were reinforced and expanded using Soviet expertise.\* The Banqiao dam was designed to protect downstream areas against severe floods expected only once every 100 years, and its spillway was designed to pass floods expected once every 1,000 years. A 1,000-year flood would cause 330 million cubic meters of runoff from 530 millimeters of rain over three days, and would create a peak inflow to the reservoir of 5,083 cubic meters of water per second. Based on these criteria, it was decided that the dam height would be increased by three meters to 116.34 meters and that an auxiliary spillway would be built. So, along with the original water release channels and sluice gates, the maximum flood spillway discharge capacity was set at 1,742 cubic meters of water per second with a maximum storage capacity for the reservoir of 492 million cubic meters and a flood storage capacity of 375 million cubic meters.

The Shimantan dam was designed to protect downstream areas against

\*For a study of Soviet dam design in the 1930s, see Anne D. Rosswiler, *The Generation of Power: The History of Dneprostroy* (Oxford: Oxford University Press, 1988). Such problems led to an increasing concern in the mid-1950s among Chinese hydrologists about the quality of Soviet advice.

a once-in-50-year flood, with spillways designed for a once in 500-year flood. It would cause 88 million cubic meters of runoff from 480 millimeters of rainfall over a three-day period, and create a peak inflow to the reservoir of 1,675 cubic meters of water per second. Based on that design, the dam height was increased by 3.5 meters to 109.7 meters, the maximum storage capacity was 94.4 million cubic meters with a flood storage capacity of 70.4 million cubic meters.

After the Banqiao and Shimantan dams were built, the pace of dam construction quickened and was extended beyond the mountain regions and into the central plains. Between 1957 and 1959, over 100 dams and reservoirs were built in Zhumadian Prefecture alone. Henan Province's experiences in the "Harness the Huai River" campaign became the model for dam construction nationwide during the Great Leap Forward in 1958. Vice Premier Tan Zhenlin announced a policy of "giving primacy to water accumulation for irrigation, construction of small-scale reservoirs, and economic self-reliance of the agricultural brigades." Since the problems of dam and reservoir construction in the mountains "had basically been solved," he proclaimed that "dam building should be extended to the plains."

In response to the vice premier's plans, a hydrologist named Chen Xing pointed out that building reservoirs in the plains and the policy of giving "primacy to accumulation and irrigation" would cause serious environmental damage. He argued that the accumulation of vast quantities of water in reservoirs throughout Henan Province would raise the water table beyond safe levels, cause severe waterlogging of agricultural land, and increase the salinity and alkalization of the soil. In short, he warned that dam construction on the plains would have disastrous consequences.

Unfortunately, these warnings were ignored. The authorities' fixation on the policy of giving primacy to the accumulation of water and to irrigation came to define dam-construction policy in China and led to the construction of reservoirs and dams on a massive scale. In Anhui Province a whole slew of small-scale reservoirs soon sprang up in hilly areas. And the Huai River Valley was dammed to the point where the river's natural flow was essentially destroyed.

Chen Xing designed the largest reservoir on the plains, the Suyu Lake reservoir of Zhumadian, Henan, which was built during the Great Leap Forward. During its construction, a deputy head of the Henan Province water resources department criticized Chen's design as being "too conservative" and, in defiance of hydrological safety standards, reduced the

number of sluice gates in the dam from an originally planned twelve to only five.

Similarly, officials reduced the number of spillway gates at the Bantai emergency flood diversion project on the border of Henan and Anhui provinces from the original nine to seven. Then, in 1961, they blocked off two of the remaining gates, all under the guise of "primacy to accumulation and irrigation."

Following the Great Leap Forward disaster, Henan, and the country as a whole, experienced the "three difficult years" (1959–61).<sup>\*</sup> According to accounts at the time in the Chinese press, this was supposedly not a difficult time for Henan, and no large-scale disasters were reported in the area. But in reality, flooding and famine were widespread throughout the central plains area. Liu Jianxun, who was appointed Party secretary in Henan Province in 1961, blamed dam and reservoir construction for the disasters. To help correct the problems, he searched everywhere for the dam "opponents" and found Chen Xing at Xinyang.

During the Great Leap Forward's backyard furnace campaign, Chen had suggested that donating watches and other such personal items to the steel campaign was useless and that the price of the campaign was too high. He also challenged the idea that the "Sputnik model" of the People's Commune (with its extravagant claims of vast increases in agricultural production) should be emulated by an equally extravagant policy of building more and bigger dams. For this he was labeled a "right-wing opportunist," and purged.

During the 1961 campaign to "rectify deviations and correct past errors," a large-scale study of dams and reservoirs was conducted in Henan. A number of substandard dams were repaired and many other potentially dangerous ones, including a few large dams, were demolished. The policy of "primacy to water accumulation and irrigation" was not, however, completely reversed. By the end of the 1960s, the persistence of this policy led to the construction of more than 100 additional dams and reservoirs in Zhumadian. The reclamation and settlement of large tracts of land which had historically been left bare for flood diversionary purposes further

<sup>\*</sup>The disastrous impact of the Great Leap Forward on Henan Province is documented in Jean-Luc Domenach, *The Origins of the Great Leap Forward: The Case of One Chinese Province*, trans. A.M. Berrett (Boulder: Westview Press, 1995), and in Jasper Becker, *Hungry Ghosts: Mao's Secret Famine* (New York: Free Press, 1997).

reduced the ability to manage emergency floods on the Hong and Ru rivers. Other flood management measures, such as the strengthening of dikes, were also neglected because no one even considered the possibility of a catastrophic dam collapse. Just prior to the 1975 disaster, a 1.9-meter-high earthen embankment was added on to the top of the Shimantan dam to increase its overall holding capacity, while at Banqiao, officials authorized an additional retention of no less than 32 million cubic meters of water in excess of the dam's designed safe capacity.

The dam's modifications and the persistence of the policy of accumulating water above all else were based on limited historical knowledge and incomplete survey data.\* When the big flood hit in August 1975, they were dumbfounded by the torrential rains.

### "The River Dragon Has Come (*Chu Jiaozi!*)"

The "August 1975 Disaster," as the dam collapses have come to be known, was the result of three successive deluges. The storm hit southern Henan on August 5, and in the initial downpour, a total of 448.1 millimeters of rain fell on the region, about 40 percent more than the heaviest previous rainfall on record. The water level at the Banqiao dam rose to 107.9 meters, bringing it close to maximum capacity.

The experts were now at the mercy of the flood: The sluice gates were opened, but were partially blocked by accumulated silt. This impeded the dam's ability to drain, so the water level continued to rise causing flooding in nearby areas. By the evening of August 5 the water was already one meter deep in the courtyard of the Banqiao Reservoir Management Bureau. The flooding knocked out telephone service causing the bureau to lose contact with the weather stations measuring rainfall in the upper reaches of the reservoir. As the waters continued to rise, all telephone and road communication with the dam site was severed. The cadres of the Banqiao commune tried to move the elderly and the children out of the area and to rescue what files they could.

The second deluge began at noon the following day and lasted for sixteen hours. The water at the dam reached 112.91 meters, more than two meters above its designed safe capacity. The third and final downpour

\*The woefully inadequate data on local conditions is documented in Oksenberg, "Policy Formulation."

began at 4:00 P.M. on August 7 and lasted for thirteen hours. That evening at 7:00, the Zhumadian Municipal Revolutionary Committee convened to assess the dangers posed by flooding to the dams at Suyu Lake, Songjiachang, Boshan, and elsewhere. The potential danger to the Banqiao dam, however, was never mentioned: it was thought to be an "iron dam," one that could never collapse. By 9:00 P.M., seven smaller dams at Queshan, Miyang, and elsewhere in the area had collapsed, followed an hour later by the medium-sized Zhugou dam. Before the sun rose the next morning, 62 dams had collapsed in Henan.

Around the same time, a thin line of people stood strung out across the top of the Banqiao dam, toiling waist-deep in water trying to repair the rapidly disintegrating embankment. Suddenly there was a flash of lightning followed by deafening thunder. Silence followed, and, for a brief instant, the skies cleared and the stars appeared again overhead. Someone shouted, "The water level is going down! The flood is retreating!" But just a few seconds later, the dam gave way, and 600 million cubic meters of water erupted with a demonic and terrifying force. Somewhere, a hoarse old voice cried out, "The river dragon has come!"

Over the next five hours, a gigantic wall of water travelling nearly fifty kilometers per hour cascaded downward over the surrounding valleys and plains obliterating everything in its path. Shortly afterward, the Shimantan dam also collapsed, to largely similar effect. Entire villages and small towns disappeared in an instant. A government order issued the previous day to evacuate local residents had applied only to populations living in the immediate vicinity of the Banqiao dam; eastward of Shahedian Town, no such evacuations had been carried out. Shahedian Town saw 827 of its 6,000 residents perish. Wencheng commune, east of Shahe County, lost half of its 36,000 residents, while 1,000 of the 1,700 residents of the commune's Weiwan Brigade were killed. Wei Shixing, a peasant who lost two family members in the storm, recalled, "I was looking for rope to help get my parents on to the roof of our house. But as soon as my father tied the rope to the roof, the flood waters rushed into our house and snapped the thick rope like a thread. The last thing I saw was my parents being carried away by the water."\* The massive Suyu Lake Reservoir, whose

\*See, *Zhongguo lishi dahongshui, xiace* (Major Floods in Chinese History, Vol II), p. 141. This book contains the only known photographs, taken on the day after the dam collapses, of the post-disaster scenes at Banqiao and Shimantan. A newsreel of the disaster was also produced for viewing by China's top leadership, but, as far as is

emergency sluice gates had been more than halved in number by ardent Maoist officials many years earlier, successfully withstood the typhoon, but thanks only to remedial construction work that had been completed a mere eight days earlier.

At 8:00 P.M. on August 9, Zhumadian Prefecture sent an emergency telegram to the central government that read as follows:

*To the Central Committee of the CCP, the State Council, and the Central Military Commission:* From August 5 to 8, there were a number of severe rainstorms in our area with an average rainfall of 800 millimeters that caused flood waters to accumulate to a depth of two meters like an ocean. The Banqiao Reservoir collapsed at 1:00 A.M. on August 8. The Suiping county seat was submerged and many people died. As a result of the storm, three million people have been engulfed by the flood and have been isolated on the tops of roofs and in trees for three days. Emergency!

The aftereffects of the disaster were, if anything, worse than the disaster itself. The water released from the collapsed dams combined with entrapped localized flood waters to form a huge lake, thousands of square kilometers in size, which submerged or partially covered countless villages and small towns. Because of the decades-old neglect of dike maintenance, flood diversion systems, and dredging programs in the region, there was nowhere for the water to go. The complete disruption of all transportation and communications in the region also meant that the army's emergency crews were unable to reach, feed, clothe, or otherwise assist most of the survivors for up to two weeks after the initial disaster. People were stranded in the water for days, having to endure scorching sun and blistering heat. The medical teams were helpless in the face of the catastrophic health epidemics that swiftly ensued. I learned about the aftereffects of the dam collapses by reading through documents and files from Zhumadian Prefecture, which included the following telephone records:

August 13: East of Xincai and Pingyu, the water is still rising at a rate of two centimeters an hour. Two million people across the district are trapped by the water. . . . In Runan, 100,000 people who were initially submerged

known, it has never been viewed by anyone outside the country. Coverage of the disaster in the Chinese press at the time was limited to stories of "heroic" efforts by rescue teams and locals residents, with little information on the extent of the disaster or loss of life. See *Henan ribao* (Henan Daily), August 26, 1975, and September 14, 1975. A similar coverup of the Chernobyl catastrophe is noted in Medvedev, *No Breathing Room*.

but somehow survived [by clinging to trees, rooftops, etc.] are still in the water. Forty thousand people have been rescued; 200,000 are sick with diarrhea and other related illnesses. There's no medicine. In Shangcai, 300,000 people are marooned on the dam, on rooftops, and elsewhere. Twenty communes have been engulfed by floodwaters. Many people haven't eaten anything for days. In Shangcai, another 600,000 people are surrounded by the flood; 4,000 members of the Liulianyu Brigade of Huabo commune have stripped the trees bare and eaten all the leaves . . . and 300 people in Huangpu commune who had not eaten for six days and seven nights are now consuming dead pigs and other drowned livestock.

August 17: There are still 1.1 million people trapped in the waters, including 500,000 in Shangcai. . . . The disease morbidity rate has soared. According to incomplete statistics, 1.13 million people have contracted illnesses, including 80,000 in Runan and 250,000 in Pingyu; in Wangdui commune alone, 17,000 people out of a total population of 42,000 have fallen ill, and medical staff, despite their best efforts, can only treat 800 cases a day.

August 18: Altogether 880,000 people are surrounded by water in Shangcai and Xincai. Out of 500,000 people in Runan, 320,000 have now been stricken by disease, including 33,000 cases of dysentery, 892 cases of typhoid, 223 of hepatitis, 24,000 of influenza, 3,072 of malaria, 81,000 of enteritis, 18,000 with high fevers, 55,000 with injuries or wounds, 160 poisoned, 75,000 cases of conjunctivitis, and another 27,000 with other illnesses.

August 19: 448,000 people in Zhumadian Prefecture remain in the water.

August 21: A total of 370,000 people are still trapped in the water. . . . Fifty to sixty percent of food supplies parachuted in by air have landed in the water, and 37 members of the Dali Brigade who frantically retrieved and consumed rotten pumpkins from the water have fallen ill with food poisoning.

On August 12, five days after the Banqiao and Shimantan dam collapses, a team of senior officials sent by Beijing and led by Vice Premier Ji Dengkui flew over the devastated area to inspect the damage. Chen Xing, who had slowly worked his way back to prominence after being purged during the Great Leap Forward for predicting precisely the kind of disaster they were now witnessing, accompanied them. In the midst of the massive lake created by the dam failures, the only visible bodies of land were the five county seats which rose like islands out of the lake and were packed with victims huddling together.

The sight of the trapped floodwaters confirmed all of Chen's worst fears. The area, historically a natural flood diversion area, had been subject to such intensive cultivation that eroded soil had filled the rivers and reduced their ability to drain floodwaters. As a result, the floodwaters

stagnated above Bantai, and the only way to speed up their runoff was to dynamite the areas blocking water release.

On August 13, Henan Party Secretary Liu Jianxun asked Chen Xing to return to Beijing to report to the State Council on the effects of the disaster. Liu is said to have tearfully requested of Chen: "On my behalf and on behalf of all of Henan, I make just one request—ask them to dynamite the sites blocking the water so that the people of Henan can be rescued."

With the approval of the top leadership, including Vice Premier Li Xian-nian and the minister of water resources and electric power, Madame Qian Zhengying, the decision was made to dynamite several of the major surviving dam projects in Henan so that the floodwaters could be released and allowed to drain away. Two days later, under Chen's direction, the offending dams were destroyed, among them the Bantai flood-diversion project whose sluice apertures had earlier been reduced from nine to five in the name of giving "primacy to accumulation." The release of the trapped water created terrific floods down-river on the Huai in Anhui Province.

Fourteen years after the Banqiao and Shimantan disasters, during the debate over the Three Gorges dam, Li Rui cautioned against focusing solely on reservoir storage capacity as a means to achieve flood control. He argued that "in terms of flood protection, dikes are absolutely critical. They are the most effective flood control measures on a river. Their construction and maintenance requires diligent work over the long run, but does not involve grandiose and heroic construction projects. I believe that as long as the earth and rivers exist, dikes will be absolutely necessary."

In November 1975, Madame Qian Zhengying of the Ministry of Water Resources and Electric Power delivered the keynote speech to a national conference on dam and reservoir safety that convened in the city of Zhengzhou, Henan. The following is an excerpt from her speech:

The "August 1975" storm was a severe test of our work to harness the Huai River and a severe warning about the country's dam projects. We must, therefore, learn from both the negative and positive experiences from this incident in order to improve our overall work proficiency.

Responsibility for the collapse of the Banqiao and Shimantan dams lies with the Ministry of Water Resources and Electric Power, and I personally must shoulder the principal responsibility for what has happened. We did not do a good job: First, and foremost, we have never experienced such large-scale floods or such a catastrophic series of dam collapses. We took for granted that the large dams were safe without researching the issue. We

primarily followed Soviet safety specifications and although we made some design changes, we didn't make fundamental improvements and we didn't draw from the experiences of other countries or from our own experiences. Second, we failed to establish dam specifications in accordance with the unique and special conditions of our own country. Third, we did not do a good job in reservoir management and did not study the problems in any detailed way. There were no clearly designated rules governing reservoir safety, communications, electrical supply sources, emergency procedures, and preparation of necessary materials and equipment. At the most urgent moment after the collapse of the two dams, there was a blackout that caused tremendous chaos. Fourth, there was a failure to establish clear lines of authority and leadership during the crisis. We should be held accountable for that. The two dams played a critical role in electricity generation, but since basic hydrological data was lacking, the design of the flood control system was very flawed and unreliable. After a severe rainstorm in 1972, a reassessment of the flood control system of the Banqiao reservoir was done, but necessary measures were not adopted and the overall safety level of the facility remained relatively low. Owing to the emphasis on water storage and the general ignorance of flood control systems, a 1.9-meter-high earthen ramp was added to the Shimantan reservoir to increase its overall holding capacity. Similarly, before the storm, officials authorized increasing the Banqiao reservoir's capacity by 32 million cubic meters—well in excess of the reservoir's designed safe capacity. Later, in order to protect the lower reaches during a water release, four million cubic meters of water were held back, which hastened the dam collapse. And, as I mentioned above, there was a lack of necessary measures concerning reservoir safety. Electrical power and communication were both cut off during the flood and as a result residents could not be evacuated in time and adequate warnings could not be communicated to residents in the lower reaches.

We must summarize the lessons learned over the past twenty-five years and make adequate and realistic estimates of flood potentials. The 1954 flood\* surpassed all our estimates, and in 1974 the floods in Shandong and Anhui provinces were also beyond our expectations. And this year's flood (1975) was no exception. It is said that during the Wanli imperial era during the Ming dynasty (1368–1644), floods of the same magnitude hit the Huai River. We must earnestly summarize the experiences over the past ten years and discern any meteorological or historical patterns.

\*The 1954 flood devastated the middle and lower reaches of the Yangtze. Thirty-two thousand square kilometers of cultivated land were inundated, 19 million people were displaced, and 30,000 were killed. Previous catastrophic floods had occurred in 1870 and 1949. Further floods and drought in 1956 spurred on supporters of the massive dam- and reservoir-building campaign launched during the Great Leap Forward. Lieberthal and Oksenberg, *Policy Making in China*, p. 272, and Oksenberg, "Policy Formulation."

Qian Zhengying's speech left a deep impression: Dam collapses such as the Banqiao and Shimantan disasters must never recur.

What she failed to say, however, was that [as Chen Xing had pointed out twenty years earlier], the dominant policy of "primacy to accumulation and irrigation" was bound to result in the kinds of disasters that had occurred. She also failed to explain why Chen's ideas were rejected at the time and why he later became the victim of a political purge, only to be brought back after the disasters had struck. On all this, as on the decision-making systems that caused the disasters, she remained silent.

By saying only that she personally shouldered the responsibility, Qian diffused any possible move to pursue more specific responsibility—up to and including criminal legal responsibility—for each and every one of the mistakes that precipitated the disasters. As a result, over the next decade and beyond, the old policy of damming rivers was pursued as blithely as before. And then, in 1993, Lu Youmei [former vice minister of energy and chairman of the Three Gorges Development Corporation] jumped up and proudly claimed that if anything went wrong with the Three Gorges project on the Yangtze, he would be accountable. Lu made the promise while announcing that the date for blocking the Yangtze River [for the Three Gorges dam] would be moved forward a year so as to coincide with the return of Hong Kong in July 1997. This is similar to the situation in 1972 when the completion date of the Gezhouba dam was advanced in order to celebrate the birthday of Chinese Communist Party Chairman Mao Zedong. Such are the effects of personal boasting and bombast.

In ancient times, the harnessing of water by the ancient sage Yu\* followed natural laws and respected humankind's desire to survive, raise harvests, and live a good life. He also had great respect for the inherent nature of water. Water and land coexisted peacefully.

The year after the disaster, in early summer 1976, the fertile land where the 85,000 victims were buried produced a bumper crop. Surveying the land carefully, one could see crops everywhere, but what made people's hearts quiver were the small areas where the crops were especially rich and dense.

Looking at the silvery wheat waving in the breeze, one survivor commented: "The wheat is really growing!"

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\*Yu is China's celebrated mythical hero who succeeded the legendary emperors Yao and Shun and who established the tradition of emperors building dams and controlling floods as central to their roles.